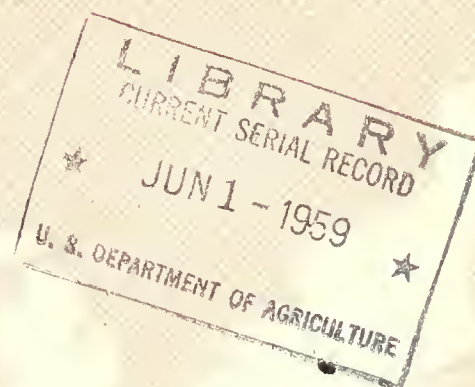


Historic, archived document

Do not assume content reflects current
scientific knowledge, policies, or practices.

A280.29
F22G
Cop. 4

GENERAL REPORT 58
MAY 1959



Integrated Petroleum Operations through Farmer Cooperatives, 1950 and 1957

by Anne L. Gessner
and
J. Warren Mather



Farmer Cooperative Service
U. S. Department of Agriculture

FARMER COOPERATIVE SERVICE
U. S. DEPARTMENT OF AGRICULTURE
WASHINGTON 25, D. C.

Joseph G. Knapp, Administrator

The Farmer Cooperative Service conducts research studies and service activities of assistance to farmers in connection with cooperatives engaged in marketing farm products, purchasing farm supplies, and supplying business services. The work of the Service relates to problems of management, organization, policies, merchandising, product quality, costs, efficiency, financing, and membership.

The Service publishes the results of such studies; confers and advises with officials of farmer cooperatives; and works with educational agencies, cooperatives, and others in the dissemination of information relating to cooperative principles and practices.

- -

This publication is a contribution from the Management Services Division, Kelsey B. Gardner, Director, and the Purchasing Division, Martin A. Abrahamsen, Director.

Contents

	Page
Highlights-----	v
Purpose of study-----	1
Method of study-----	2
Retail distribution -----	3
Cooperatives and facilities -----	3
Volume distributed -----	4
Wholesale distribution-----	6
Cooperatives and facilities -----	6
Volume handled -----	7
Refining and manufacturing -----	9
Refineries operated-----	9
Capacities of refineries -----	9
Crude oil processed -----	10
Production of refined fuels -----	10
Refining and blending lubricating oil -----	12
Manufacturing grease and other products-----	12
Production of crude oil -----	13
Producing oil wells -----	13
Production operations-----	13
Crude oil purchasing-----	15
Transportation operations -----	15
Tank trucks and highway motor transports -----	15
Barges and tankers -----	16
Pipelines -----	16
Appendix-----	18

Highlights

Farmer Cooperative Service made this study to determine the types and extent of integrated petroleum services provided for farmers by their cooperatives in 1957 and to compare them with similar services performed in 1950. The Service gathered this information because of the increasing interest of farmer cooperatives in further economic integration. Through such integration the producer may be in a better position to acquire high quality petroleum products at minimum cost.

The progress of cooperatives in integrating their activities can only be measured for various periods by data on facilities owned or operated, quantities of products handled, and individual services and functions performed at primary levels of operation. Such data for 1957 were obtained from 36 regional cooperatives that handled petroleum products. They served over 2,200 local associations, or almost all those distributing petroleum products throughout the United States. Comparative data for 1950 were available from a study published as FCA Circular C-139, "Petroleum Operations of Farmer Cooperatives."

The tables and chart at the end of these highlights summarize data on petroleum operations by cooperatives and the extent of integration in such operations.

Liquid Fuels

Retailing. -- Estimates indicated that 2,336 local cooperatives and 9 regional

cooperatives provided liquid fuels directly to farmers in 1957. This was an increase of about 5 percent over 1950.

Cooperatives handled approximately 1.96 billion gallons of liquid fuels at retail in 1957 -- an increase of 31 percent over 1950.

Cooperatives distributed approximately 20 percent of the liquid fuels used by farmers in 1957, compared with 16 percent in 1950. Retail volume of cooperatives, however, accounted for only 2.2 percent of all liquid fuels used in the domestic trade in the United States in 1957 and 2.3 percent in 1950.

Wholesaling. -- Estimates indicated that approximately 95 percent of the retail volume of cooperatives was obtained through 30 wholesale cooperatives in both years covered by this study. However, total cooperative wholesale volume of 2.2 billion gallons was 13 percent more than the retail volume in 1957 because of excess production of some refineries owned by the wholesale associations.

Gasoline represented about 64 percent of the wholesale volume in 1957 compared with 68 percent in 1950; burning or heating fuels increased to 27.5 percent compared with 15 percent; and miscellaneous tractor fuels decreased from 17 percent to about 8.5 percent.

Cooperatives owned 20 refined fuel terminals with a capacity of 155 million gallons in 1957, almost three times that for 1950.

Refining. -- Approximately 85 percent of the wholesale volume of cooperatives was produced by 11 refineries

owned by regional cooperatives in 1957. This was almost the same proportion as in 1950 when cooperatives operated 20 oil refineries.

Cooperatives modernized and enlarged their refineries during the period. The combined capacities of cooperative plants accounted for 1.2 to 1.9 percent of the crude oil distillation, thermal cracking, catalytic cracking, and catalytic reforming capacity of all refineries in the United States in 1957.

Cooperatives processed over 138,000 barrels of crude oil per day, or 1.7 percent of the total processed in the United States in 1957.

During the 7-year period, cooperative refineries increased their yields of gasoline considerably and reduced yields of residual fuel oil markedly.

Producing. -- About 31 percent of the crude oil cooperatives refined in 1957 was produced by 12 associations on a gross basis; that is, before eliminating oil belonging to royalty owners and partners in jointly owned leases. The net ownership of cooperatives accounted for 12.5 percent of the crude oil they refined.

Transportation. -- An estimated 95 percent of total retail sales of liquid fuels was delivered in 1957 to patrons in 5,361 tank trucks owned or operated by cooperatives.

Almost 56 percent of the wholesale volume was hauled from refineries and terminals to local cooperatives by 431 transports owned by cooperatives.

Twenty-two percent of the fuels moved from refineries to terminals in 694 miles of pipelines that cooperatives owned, and another 8.4 percent was hauled in the 11 barges and 2 tankers they owned.

Liquefied Petroleum Gas

Retailing. -- Out of approximately 708 cooperatives that distributed L. P. (liquefied petroleum) gas in 1957, 250

delivered such fuel by tank truck from their bulk plants to patrons.

Cooperatives distributed 90.7 million gallons of L. P. gas to patrons in 1957 compared with about 15 million gallons in 1950. Data were not available as to the proportion this volume was of the total used by farmers in the United States in either year.

Wholesaling. -- Approximately 98 percent of the total retail volume was acquired through wholesale cooperatives in 1950 and 1957.

Wholesale volume was 91.8 million gallons in 1957 compared with 15 million gallons 7 years earlier.

Refining. -- Eighty-five percent of the wholesale cooperative volume was produced in refineries owned by cooperatives in 1957, compared with 86 percent in 1950.

Transportation. -- Estimates indicated that about 90 percent of the retail volume was delivered to patrons in 323 tank trucks operated by cooperatives in 1957. Also, over 14 percent of the cooperative wholesale volume was hauled to local associations by 11 highway transports owned by cooperatives. Such data were not available for 1950.

Lubricating Oil and Grease

Retailing. -- Estimates indicated that 3,393 cooperatives distributed oil and grease at retail in 1957, with 1,048 of these local associations handling these items but not liquid fuels.

Cooperatives distributed approximately 21.3 million gallons of lubricating oil and 20.1 million pounds of grease in 1957. These volumes represented increases of 18 percent for oil and 10 percent for grease over those in 1950. Data were not available for determining the proportions of these products distributed to farmers in either year.

Wholesaling. -- About 85 percent of the total retail volume of lubricating oil

and grease was acquired through wholesale cooperatives compared with 80 percent in 1950. However, total wholesale volume of oil was 74 percent greater than the retail volume because of excess production of one lubricating oil refining facility. Likewise, the wholesale volume of grease exceeded the retail volume by 27 percent because of the excess production of one grease manufacturing plant.

Manufacturing. -- One cooperative refinery produced approximately 18 million gallons of lubricating oil in 1957. This output was equivalent to about 49 percent of the total wholesale volume of oil for all cooperatives that year. The production of this plant in 1950 was 8.5 million gallons.

The regional cooperatives owned 10 blending or compounding plants which blended 20.2 million gallons of lubricating oil in 1957. This was equal to about 55 percent of total wholesale cooperative volume that year, and an increase of about one-third over the volume blended in 1950.

One cooperative grease plant manufactured 6.7 million pounds of grease in 1957 compared with 5.3 million pounds in 1950. Its output was equivalent to 26 percent of total wholesale cooperative volume in 1957.

Crude Oil

Production. -- Twelve regional cooperatives produced crude oil in both 1950 and 1957. During the latter year they operated 3,318 oil wells on a gross basis. The number operated in 1950 was 1,945. Cooperatives owned 1,691 oil wells on a net basis in 1957 compared with 1,562 in 1950.

Cooperatives produced 42,653 barrels of crude oil a day on a gross basis in 1957 compared with 29,400 barrels in 1950. On a net basis their production was 17,339 barrels a day in 1957 compared with 15,292 barrels 7 years earlier. As mentioned, this gross production was equal to about 31 percent of the crude oil refined by cooperatives in 1957, and the net production represented only 12.5 percent of the amount refined.

Transportation. -- Cooperatives transported through 1,499 miles of their own gathering pipelines and 566 miles of trunk pipelines about 54 percent of the crude oil processed in their refineries in 1957. They moved 5 percent of the crude oil to their plants with 7 of their own barges, and another 3.7 percent with 25 highway transports which they owned. Data on the amounts transported were not obtained for 1950.

Summary Table 1. - Record of cooperative petroleum operations, 1950 and 1957¹

	<u>1950</u>	<u>1957</u>
<u>Retail distribution</u>		
Local cooperatives handling:		
Liquid fuels.....	2,230	2,336
Lubricating oil and grease only.....	(2)	1,048
Liquefied petroleum (L. P.) gas.....	³ 280	708
Local bulk plants operated for		
liquid fuels.....	2,750	2,779
Local bulk plants operated for L. P. gas...	42	³ 250
Local service stations operated.....	⁴ 1,837	1,964
Sales of liquid refined fuels, gallons.....	1,486,650,000	1,957,416,000
Percent of liquid fuels used by		
farmers.....	16.0	20.4
Percent of total liquid fuels.....		
consumed in U. S.	2.3	2.2
Sales of liquefied petroleum gas, gallons..	15,000,000	90,724,000
Sales of lubricating oil, gallons.....	17,963,000	21,250,000
Sales of grease, pounds.....	18,312,000	20,136,000
<u>Wholesale distribution</u>		
Regional cooperatives handling		
refined fuels.....	29	30
Refined fuel terminals owned ⁵	12	20
Storage capacity of terminals, gallons...	55,650,000	155,140,000
Sales of liquid refined fuels, gallons ⁶	1,628,277,000	2,210,119,000
Percent of total liquid fuel sales		
represented by:		
Gasoline.....	68.1	63.8
Kerosene.....	6.6	2.8
Diesel and other tractor fuels.....	10.6	5.9
Burning or heating fuels.....	<u>14.7</u>	<u>27.5</u>
Total.....	100.0	100.0
Sales of liquefied petroleum		
gas, gallons ⁶	15,000,000	91,819,000
Sales of lubricating oil, gallons ⁶	28,139,000	36,872,000
Sales of grease, pounds ⁶	19,313,000	25,539,000
<u>Refining and manufacturing⁷</u>		
Refineries owned by regional cooperatives..	⁸ 20	11
Regional cooperatives with ownership		
in refineries.....	14	13
Crude oil distillation capacity, barrels		
per day.....	144,500	155,700
Percent of U. S. distillation capacity...	2.0	1.6
(Continued)		

<u>Refining and manufacturing (continued)</u>	<u>1950</u>	<u>1957</u>
Thermal cracking capacity, barrels per day	47,800	25,925
Percent of U. S. thermal cracking capacity.....	1.7	1.2
Catalytic cracking capacity, barrels per day.....	21,300	64,550
Percent of U. S. catalytic cracking capacity.....	1.0	1.5
Catalytic reforming capacity, barrels per day.....	(2)	29,530
Percent of U. S. catalytic reforming capacity.....	(2)	1.9
Polymerization capacity, barrels per day..	(2)	6,845
Crude oil run or processed, barrels per day.....	106,900	⁸ 138,369
Percent of U. S. runs to stills.....	1.9	1.7
Liquid fuels refined, barrels per day.....	91,300	122,200
Quantity refined, total gallons.....	1,400,000,000	1,873,339,000
Yields as a percent of crude oil run: ⁸		
Premium gasoline.....	(2)	6.7
Regular gasoline.....	(2)	44.1
Total gasoline.....	<u>40-45</u>	<u>50.8</u>
Jet fuel.....	(2)	1.0
Kerosene.....	(2)	1.6
Diesel fuel.....	(2)	5.4
Other tractor fuels.....	(2)	1.3
Heating, burner or furnace oils.....	(2)	22.0
Total other liquid fuels.....	<u>25-30</u>	<u>31.3</u>
Total liquid fuels.....	<u>65-70</u>	<u>82.1</u>
Residual fuel oil.....	25-30	9.1
Other products.....	<u>5-10</u>	<u>7.1</u>
Total.....	96-98	98.3
Lubricating oil refined (one plant), gallons.....	8,500,000	18,043,000
Lubricating oil blending plants owned, end of year.....	⁹ 13	10
Blending capacity, gallons per year.....	(2)	41,100,000
Lubricating oil blended, gallons.....	15,715,000	20,213,000
Grease manufactured (one plant), pounds...	5,321,000	6,753,000

Production⁷

Regional cooperatives engaged in production.....	12	12
Oil wells operated, gross basis.....	1,945	3,318
Oil wells owned, net basis.....	1,562	1,691
Crude oil produced, gross basis, barrels per day.....	29,400	42,653

(Continued)

Production (continued)19501957

Crude oil produced, net, barrels per day.....	15,292	17,339
Proven or producing oil lands, acres		
at year-end.....	63,488	(2)
Undeveloped or prospective oil lands,		
acres at year-end.....	310,032	(2)
Estimated crude oil reserves, barrels, net...	32,250,000	(2)

Transportation

Retail tank trucks operated by		
cooperatives for:		
Liquid fuels.....	⁴ 5,370	5,361
L. P. gas.....	70	323
Highway transports operated from terminals		
and refineries to local bulk plants for		
liquid fuels ¹⁰	366	431
Liquid fuel transported, gallons.....	(2)	1,235,715,000
Highway transports operated for L. P. gas ¹⁰ ..	1	11
L. P. gas transported, gallons.....	(2)	13,171,300
Barges and tankers operated from refineries.		
to terminals for liquid fuels ¹¹	24	13
Liquid fuels transported, barrels.....	(2)	3,760,000
Product pipelines operated from refineries		
to terminals, miles.....	258	694
Liquid fuels transported, barrels.....	(2)	9,945,010
Crude oil gathering pipelines owned, miles...	1,765	1,499
Crude oil trunk pipelines owned, miles.....	610	566
Crude oil transported, barrels ¹²	(2)	28,349,005
Barges operated for crude oil ¹¹	(2)	7
Crude oil transported, barrels.....	(2)	2,503,000
Highway transports ¹⁰ operated for crude oil..	8	25
Crude oil transported, barrels.....	(2)	1,864,155

¹Based on data supplied by regional cooperatives.²Data not available or obtained.³Estimated.⁴Revised.⁵Exclusive of refinery terminals.⁶Includes interwholesale volume and sales to other oil companies.⁷All data refer to barrels per calendar day using 365 days per year.⁸Data for 10 refineries.⁹One was not in operation at end of the year.¹⁰Owned and/or leased.¹¹Seven barges reported as transporting crude oil in 1957 were assumed to be used also for transporting refined products. Such data were not available for 1950.¹²Total transported excluding duplication between trunk and gathering lines.

Summary Table 2. - *Integration of cooperative petroleum operations, 1950 and 1957*

	<u>1950</u>	<u>1957</u>
	<i>Percent</i>	
<u>Liquid fuels</u>		
Retail volume purchased from own wholesales ¹	93.0	95.0
Wholesale volume produced in own refineries.....	86.0	85.0
Refinery volume (crude oil processed basis) obtained:		
From gross crude oil produced.....	27.5	30.8
From net crude oil produced.....	14.3	12.5
<u>L. P. Gas</u>		
Retail volume purchased from own wholesale ²	98.0	98.0
Wholesale volume refined in own plants.....	(3)	30.9
<u>Lubricating oil</u>		
Retail volume purchased from own wholesales ⁴	80.0	85.0
Wholesale volume blended in own plants ⁴	55.8	54.8
Wholesale volume refined in own plants ⁴	30.2	48.9
<u>Grease</u>		
Retail volume purchased from own wholesales ⁵	80.0	85.0
Wholesale volume manufactured in own plants ⁵	27.5	26.4
<u>Transportation</u>		
<u>Liquid fuels</u>		
Retail volume delivered in own tank trucks ⁶	95.0	95.0
Wholesale volume hauled in own highway transports..	(3)	55.9
Refinery volume transported in own pipelines.....	(3)	22.3
Refinery volume hauled in own barges and tankers...	(3)	8.4
<u>L. P. Gas</u>		
Retail volume delivered in own tank trucks ²	(3)	90.0
Wholesale volume hauled in own highway transports..	(3)	14.3
<u>Crude oil</u>		
Crude oil processed moved by own pipelines.....	(3)	53.5
Crude oil processed moved by own barges and tankers	(3)	5.0
Crude oil processed moved by own highway transports	(3)	3.7

¹Estimated. Total wholesale volume was 109.5 and 112.9 percent of retail volume in 1950 and 1957 respectively. The wholesale volume in 1957 exceeded retail volume primarily because the refinery capacities were enlarged when recently modernized.

²Estimated.

³Not available or obtained.

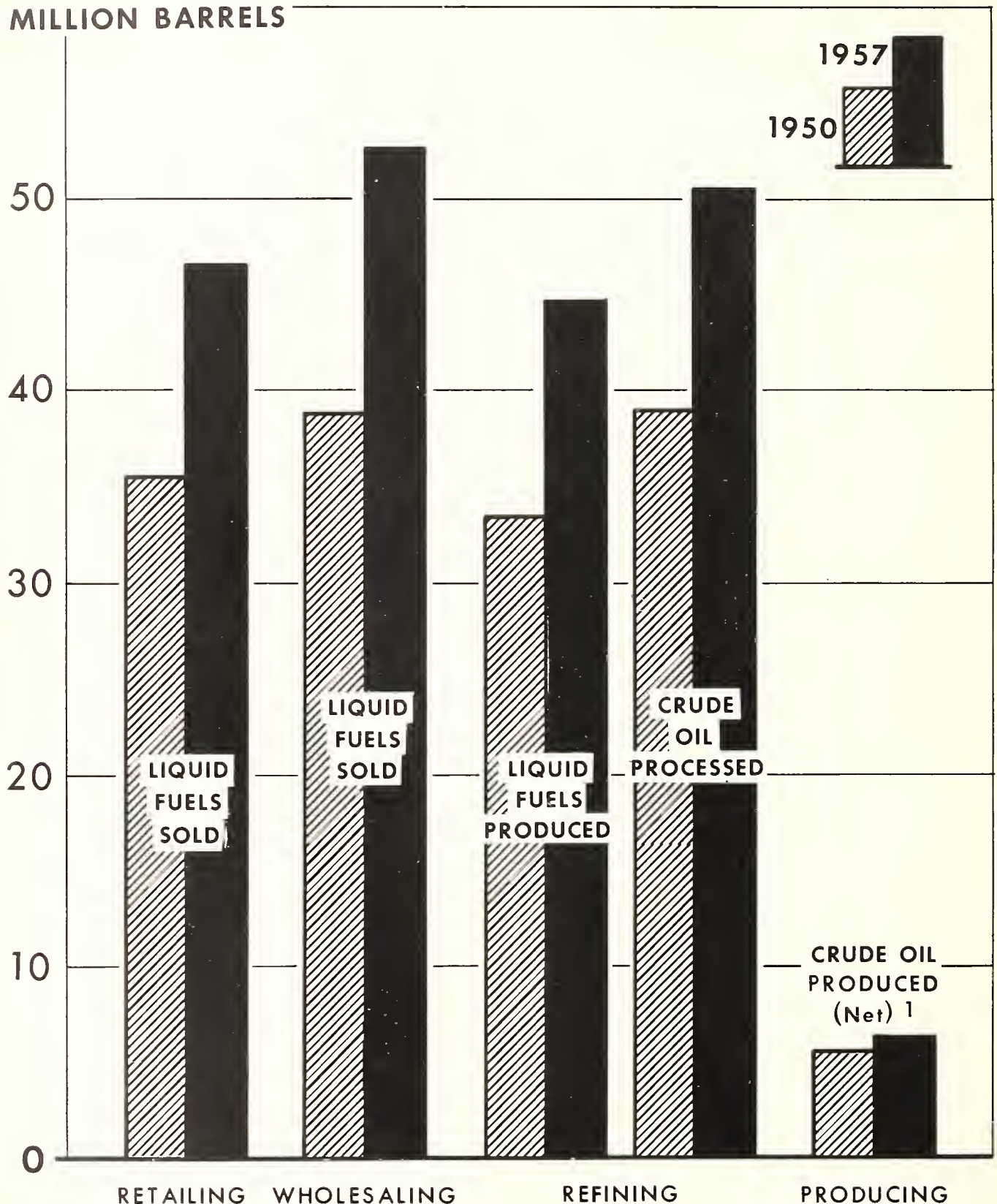
⁴Estimated. Wholesale volume was 156.6 and 173.5 percent of retail volume in 1950 and 1957, respectively, because of excess production of one lube oil refinery.

⁵Estimated. Total wholesale volume was 105.5 and 126.8 percent of retail volume in 1950 and 1957, respectively, due to excess production of one grease plant.

⁶Estimated. Includes trucks owned or operated.

SUMMARY FIGURE 1

Integration in Petroleum Operations of Farmer Cooperatives, 1950 and 1957



¹ After eliminating oil belonging to royalty owners and partners in jointly owned leases.

Integrated Petroleum Operations Through Farmer Cooperatives, 1950 and 1957

by Anne L. Gessner¹
and J. Warren Mather²

The continuing increase of mechanization in agriculture has been accompanied by increased consumption of petroleum products on the farm. Farmers require large quantities of fuel to power the tractors, trucks, automobiles, conveyors, and many other types of motor-driven equipment now essential to farm operations. They also use many lubricants for such equipment and large quantities of fuel oil and liquefied petroleum gas for home heating and other purposes.

Many farmers formed cooperatives to provide themselves with high quality oil products at the lowest possible cost. These cooperatives represent a form of economic integration by farmers to procure needed production supplies.

Over the years, petroleum cooperatives have found it advisable to follow industry trends and to vertically integrate their operations further. Beginning first with retailing, they moved on to wholesaling and then on to refining and producing crude oil. Their own transportation services accompanied each step. This was consistent with the integrated activities of farmers in earlier days when they produced their own feed for horse and mule power.

Purpose of Study

The purpose of this study was to determine the status of cooperatives in handling petroleum products in 1957 and

to measure trends since 1950. The study supplies information on the following: (1) numbers and types of petroleum facilities owned or operated by farmer cooperatives; (2) physical quantities of petroleum products cooperatives handled at various levels of operation;

¹Chief, History and Statistics Branch, Management Services Division.

²Chief, Farm Supplies Branch, Purchasing Division.

(3) numbers and kinds of services or functions cooperatives performed in processing and distributing petroleum products; and (4) extent to which farmer cooperatives had integrated their petroleum operations.

Annual statistics are available on the number of farmer cooperatives handling petroleum products and on the total sales value of these products. But these statistics are limited in a number of respects. They provide no information on how far the cooperatives have integrated primary petroleum services such as drilling oil wells, operating refineries, and acquiring pipelines, highway transports, and other distribution facilities. Nor do they provide an accurate measure of the physical volumes of various petroleum products handled by cooperatives at different levels of

operation.

There is increasing awareness that greater attention must be given to the possibilities of integrating the operations of farmer cooperatives so that the producer may be in a more advantageous position in acquiring production supplies, including petroleum products. Thus, cooperative management, in making policy decisions relating to integration, requires information on the relative importance of the major cooperative services and functions performed in the production, processing, and distribution of petroleum products.

Detailed and comparable information compiled periodically on different levels of operation will provide the necessary benchmarks for measuring progress, growth, and relative importance of cooperatives in the petroleum field.

Method of Study

Information for 1957 was provided in a mail questionnaire by 36 regional cooperatives that handled petroleum products. These cooperatives supplied about 95 percent of the liquid fuels distributed at retail to farmers by all cooperatives. Thus, it was possible to develop estimates of total retail distribution by all farmer cooperatives from data supplied by these regional associations.

The 36 regional cooperatives included all regionals performing one or more of the following petroleum operations: wholesaling, refining, and crude oil producing.

Information for 1950 was obtained from 29 regional cooperatives for a study at that time to determine if cooperatives could further coordinate their petroleum operations. Data were later summarized and published, thus making it possible to indicate trends in various petroleum services and functions from 1950 to

1957.³ However, comparisons could not be made on several operations because some 1950 records were incomplete.

This report discusses the principal integrated functions of petroleum services in the following order: retail distribution, wholesale distribution, refining and manufacturing, crude oil production and purchasing, and transportation.

The information is presented in this order because farmers first purchased petroleum products on a cooperative basis through retail associations. Then they began federating and integrating the operations of these cooperatives to include wholesaling and later refining services. Finally they went all the way back in the integrating process by producing crude oil. Transportation

³Mather, J. Warren, Petroleum Operations of Farmer Cooperatives, Farm Credit Administration, U. S. Dept. of Agr., Circular C-139 (now available from Farmer Cooperative Service).

services they added were an intrinsic part of each operation. Farmers say their cooperatives become "basic" when

the integrating process goes far enough back to produce raw materials required for a production supply item.

Retail Distribution

Farmers first organized local petroleum retail cooperatives or added petroleum departments to their marketing cooperatives in the mid-1920's. Since then, cooperative distribution of oil products has continued to increase each year throughout the country. These local petroleum service agencies, therefore, are the foundation for all integrated petroleum operations of farmers.

Cooperatives and Facilities

Liquid Fuels

In the fiscal year 1957, 2,336 local cooperatives and branches of 9 regional cooperatives operated 2,779 bulk plants to provide liquid fuels for farmers. This was a slight increase in plants over 1950. Most of this increase was in New York and the South.

The 2,336 local cooperatives had 2,691 bulk plants in 1957. Of this total, 2,221 locals with 2,571 bulk plants obtained their fuels from wholesale cooperatives. The other 115 local cooperatives with approximately 120 bulk plants obtained liquid fuels from other than cooperative sources. Local cooperatives included both specialized petroleum associations and marketing associations, particularly grain cooperatives, that operated petroleum departments. The information available did not permit a breakdown of these associations by commodity types.

Local cooperatives delivering oil products to farmers were located primarily in the central part of the United States where farming was highly mechanized. These central States were Ohio,

Indiana, Michigan, Illinois, Iowa, Wisconsin, Missouri, Minnesota, Kansas, and Nebraska. They accounted for approximately 85 percent of the local cooperative bulk plants that were supplied by regional wholesale cooperatives in 1957.

The diversification and mechanization of cotton and other farming operations, however, is gradually increasing the cooperative purchasing of farm supplies in the South. While farm consumption of fuels is large in California, cooperatives have given little attention to the distribution of petroleum products. However, some general farm organizations and regional cooperatives bargain with major oil companies for year-end brokerages or volume discounts on refined fuels sold direct to their members.

Besides the 2,691 bulk plants operated by the local cooperatives, 88 additional bulk plants operated by 9 branches of regional wholesale cooperatives were serving farmers in 1957.

Local and regional cooperatives operated a total of 5,361 tank trucks for the retail distribution of liquid fuels in 1957. Local associations affiliated with regional cooperatives operated 5,211 liquid fuel tank trucks -- an average of 2.3 per association and 2 per bulk plant. Another 150 tank trucks were operated by nonaffiliated cooperatives.

A number of local petroleum cooperatives also owned highway transports that had a capacity of over 2,000 gallons for hauling fuel from refineries and terminals to their bulk plants. Some local cooperatives in Nebraska, North Dakota, South Dakota, and Minnesota

formed cooperative transport associations for this purpose. A discussion of the transportation of petroleum products by cooperatives appears in the last section of this report starting on page 15.

Cooperatives operated an estimated 1,964 service stations in 1957 compared with 1,837 in 1950. Of this total, local cooperatives affiliated with regional wholesale associations operated 1,895 retail filling stations, and unaffiliated local associations operated approximately 50 of such stations in 1957. In addition, 7 regional wholesale cooperatives through their branches operated 19 retail filling stations.

Few cooperatives east of Illinois had service stations. Only 18, or less than 1 percent of the cooperative total, were operated in the eastern States in 1957.

Lubricating Oil and Grease

Approximately 3,393 cooperatives distributed motor oil and grease at retail in 1957.⁴ All of the local and regional cooperatives handling liquid fuels at retail also sold oil and grease. To these were added another 1,048 local associations which regionals reported supplying with oil and grease but not liquid fuels. Similar data were not available in 1950.

Liquefied Petroleum Gas

A total of 708 local cooperatives distributed liquefied petroleum gas (L. P. gas), such as propane and butane, in 1957. This represents a substantial increase over the 280 cooperatives that reported handling this product in 1950.

In 1957 approximately 250 of the 708 associations operated L. P. gas bulk plants with 323 delivery tank trucks. The other 458 cooperatives handled "bottled" gas. In 1950, only 42 of the 280 associations reported operating L. P. gas bulk plants and trucks. Later information, however, indicated that data on number of plants were incomplete.

Volume Distributed

Liquid Fuels

The total volume of liquid fuels distributed at retail by farmer cooperatives in the fiscal year 1957 was approximately 1.96 billion gallons, or 46.6 million barrels (figure 1). This was an increase of 31 percent over the 1.49 billion gallons, or 35.4 million barrels, distributed by cooperatives in 1950. Their volume in 1957, however, was equivalent to only 2.2 percent of total liquid fuels (gasoline, kerosene, and distillates) used in the domestic trade in the United States. This compares with 2.3 percent in 1950. Data for the petroleum industry in the United States are shown for 1950 and 1957 in the appendix.

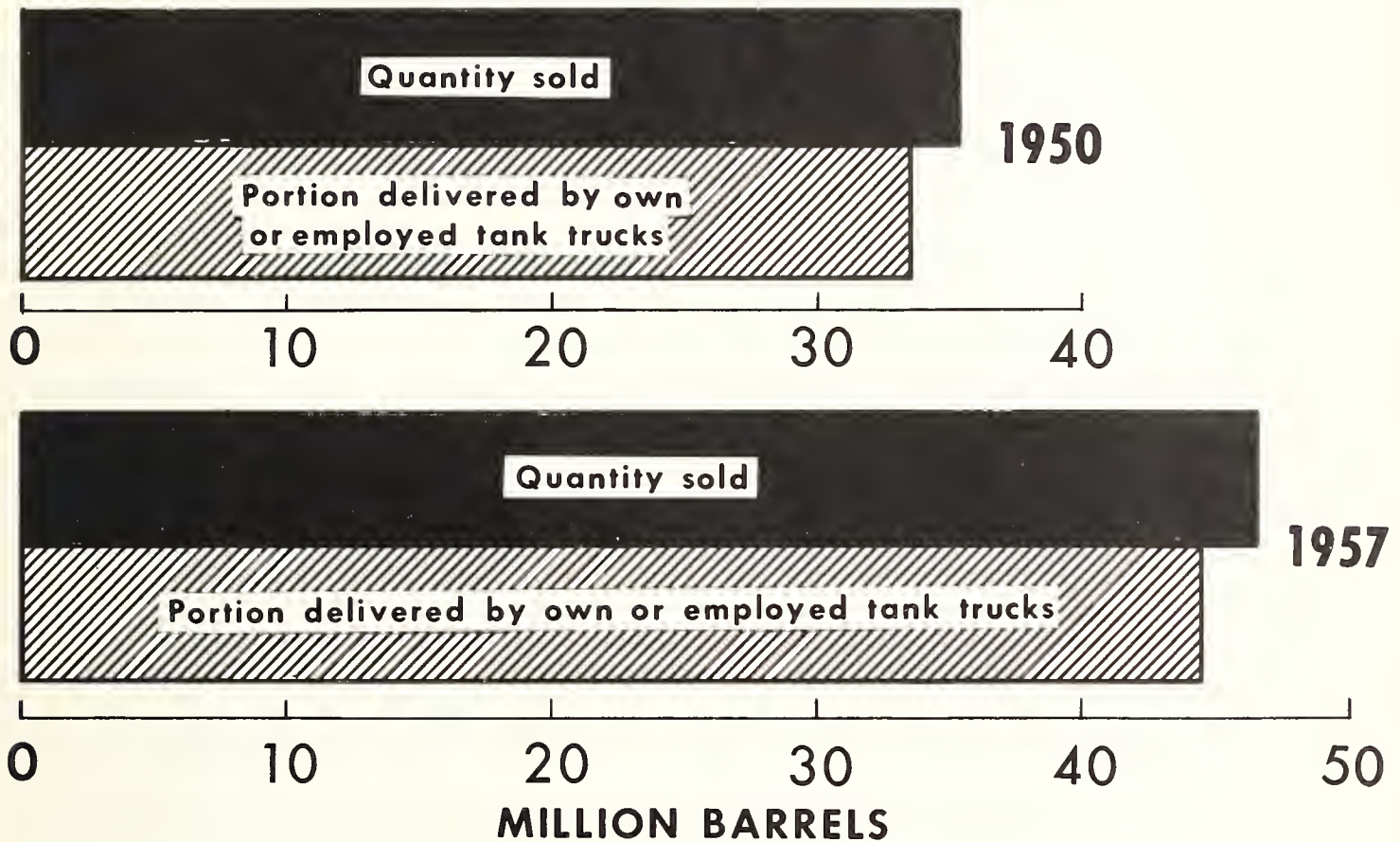
After deducting amounts sold to non-farmer patrons, cooperatives distributed about 20 percent of the liquid fuels used by farmers in 1957. Their proportion was around 16 percent in 1950.

About 95 percent of the liquid fuels distributed from bulk plants of cooperatives in 1957 were hauled to patrons in 5,361 tank trucks owned by the associations or by their commission salesmen. Patrons hauled very little fuel from the plants with their own trucks and drums. Also, the cooperatives hauled some fuel from their bulk plants to their service stations with their tank trucks. In 1950, cooperatives operated 5,370 tank trucks.

⁴This number is somewhat higher than the 2,794 associations which reported sales of petroleum products to Farmer Cooperative Service in 1956-57. The fact that oil and grease were included as "miscellaneous supplies" by some of the associations may explain some of the difference. Also, a few locals may have been obtaining oil and grease from more than one regional cooperative.

FIGURE 1

Retail Distribution of Liquid Fuels by Farmer Cooperatives, 1950 and 1957



Liquefied Petroleum Gas

Cooperatives distributed 90.7 million gallons of liquefied petroleum gas to their patrons in 1957. This was an important development during the past 7 years, because cooperatives handled only about 15 million gallons in 1950. Data were not available for determining the proportion of this product distributed to farmers in either 1950 or 1957.

All L. P. gas distributed from bulk plants in 1957, or about 90 percent of the cooperative retail volume, was hauled in the cooperatives' 323 tank trucks.

L. 1950, they operated 70 tank trucks for L. P. gas.

Lubricating Oil and Grease

Cooperatives in 1957 retailed more than 21.2 million gallons of lubricating oil and more than 20.1 pounds of grease. The increases were 18 percent for oil and 10 percent for grease over those in 1950. Data were not available for determining the proportions of these products distributed to farmers in 1950 or 1957.

Wholesale Distribution

The formation of wholesale associations to supply cooperative retail outlets was the first step farmers took in vertical integration of petroleum services beyond the retail level. Several were established in the late 1920's. The locals soon saw that by pooling their purchasing power they could gain in two ways: They could realize additional savings from wholesale operations, including transportation, and they could help assure a more dependable supply of quality products.

Cooperatives and Facilities

In 1957, 30 regional cooperatives were supplying refined fuels, lubricating oil, and grease at wholesale to 2,221 affiliated local cooperatives. This was approximately the same number of regional wholesale cooperatives as in 1950. As mentioned, these regionals supplied practically all the liquid fuels distributed by 95 percent of the local farmer cooperatives with bulk oil plants in the country.

Four additional regional cooperatives either supplied their centralized farmer membership direct or bargained with oil companies for volume discounts or brokerages on purchases made by their farmer members direct from facilities of these companies. One other regional cooperative handled only lubricating oils and greases for its patrons. One jointly owned regional cooperative that operated a refinery did not distribute at wholesale.

Eight of the 30 regional wholesale associations supplied L. P. gas to locals at wholesale.

The number of local cooperatives and bulk plants the regionals served with liquid fuels varied widely. Some served only a small number of local

cooperatives in a limited area, others served an entire State, and some served several States. In the beginning some of the regionals were controlled by Statewide affiliates of general farm organizations. At the time of this study, most were independent organizations, although some retained in their names an identification with these Statewide affiliates and maintained close relations with them.

Most regional cooperatives that performed a wholesale petroleum service were diversified and purchased various other supplies and equipment for local cooperatives. However, out of the 30 wholesale cooperatives, petroleum products represented more than one-half the dollar volume of 14, almost one-half the volume of 2, and between one-half and one-third of the volume of 3. Nine associations had varying percentages that were under one-third of their total volumes. Only two regionals were specialized petroleum cooperatives.

One of the first ways regional cooperatives integrated their operations was by acquiring highway motor transports for hauling refined fuels from terminals to local bulk plants. This was undertaken in some cases to realize net savings over rail transportation, and in others to provide better service to local affiliated cooperatives.

In 1957, 18 regional wholesale cooperatives operated 263 highway transports to haul refined fuels from refineries and terminals to local bulk plants. These transports hauled about 754 million gallons, or 34 percent of the wholesale volume. In 1950, regionals operated 214 highway transports for this purpose.

In 1957, regionals had 11 highway transports for hauling liquefied petroleum gas compared with 1 in 1950. They hauled about 13 million gallons, or

14 percent of the wholesale volume, in 1957. Similar data for 1950 were not available. Further comments on these operations are included in the discussion on transportation.

Another early form of integration by regional wholesale cooperatives was the operation of marine storage terminals. Later they acquired a few pipeline terminals. Cooperatives obtained these facilities for various reasons: to aid them in handling open-market purchases; to permit purchases of petroleum from barge and pipeline facilities; to maintain year-round deliveries in their territories; and to supplement refining operations.

In 1957, 11 regionals owned 20 storage terminals with a capacity of 3,692,857 barrels, or 155.1 million gallons. One of these also operated 4 other pipeline and 1 deep water terminal. In 1950, 10 regionals owned 12 terminals with a capacity of 1,326,190 barrels, or 55.7 million gallons, and leased 4 terminals with a capacity of 476,190 barrels, or 20 million gallons.

Volume Handled

Liquid Fuels

The 30 regional wholesale cooperatives distributed 52.6 million barrels, or over 2.2 billion gallons, of liquid fuels in 1957 (figure 2). This represented an increase of 35 percent over the 38.8 million barrels, or 1.6 billion gallons, sold in 1950. These wholesale volumes are exclusive of transfers to their own retail bulk plants and stations.

The proportion of liquid fuels distributed for home heating purposes increased markedly -- from 14.7 percent in 1950 to 27.5 percent in 1957. Gasoline remained near two-thirds of the total -- accounting for 63.8 percent in 1957 compared with 68.1 percent in 1950.

Kerosene and "tractor fuels" consisting mostly of diesel fuel declined in importance.

An analysis of these sales of liquid fuels at wholesale in 1957 indicates that more than 1.7 billion gallons, or 77 percent, were supplied to affiliated local cooperatives; about 80 million gallons, or 4 percent, went to smaller regional cooperatives; and the balance of 424 million gallons, or 19 percent, went to other oil firms. Comparable data were not available for 1950.

The volume of liquid fuels distributed at wholesale by regional cooperatives exceeded total retail volume by 13 percent in 1957. This situation resulted because most of the regionals enlarged the capacities of their refineries when they modernized them in recent years. Also, some exchanges may have been included in the reported data on volumes distributed to other oil firms by one or more regional cooperatives. In 1950 the wholesale volume of cooperatives exceeded their retail volume of liquid fuels by almost 10 percent.

L. P. Gas

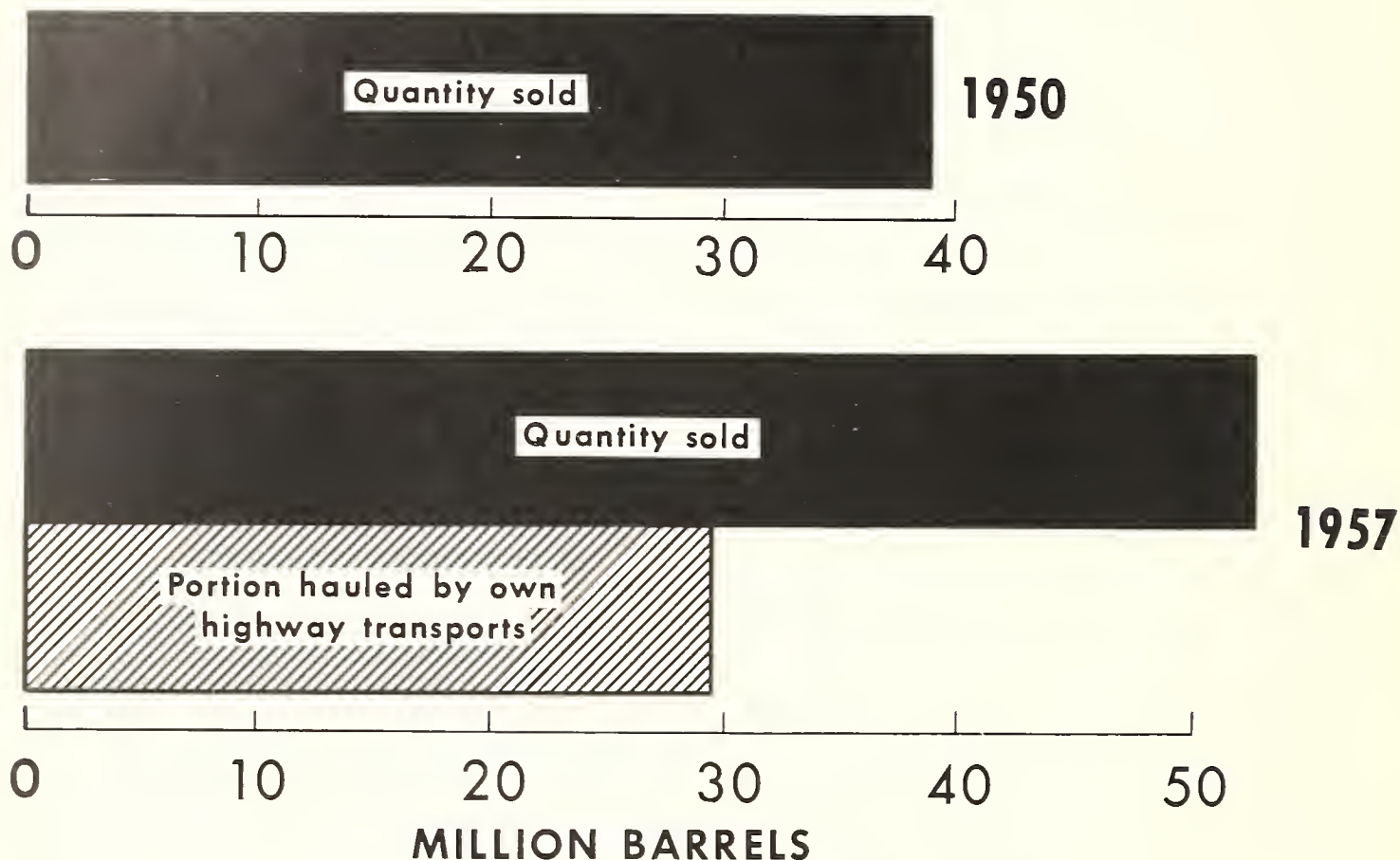
Eight regional cooperatives had a total wholesale volume of liquefied petroleum gas of 91.8 million gallons in 1957, with 93.8 percent distributed to affiliated locals. Another 1.6 percent was distributed to smaller regional cooperatives, and the balance of 4.6 percent went to other firms. Total volume in 1950 was only about 15 million gallons. An estimated 98 percent of the total retail volume was acquired through wholesale cooperatives in 1950 and 1957.

Lubricating Oil and Grease

Regional cooperatives distributed 36.9 million gallons of lubricating oil at

FIGURE 2

Wholesale Distribution of Liquid Fuels by Farmer Cooperatives, 1950 and 1957



wholesale in 1957. This was an increase of 31 percent over the 28.1 million gallons sold in 1950. These regionals distributed 52.8 percent of the 1957 sales to affiliated local cooperatives, 21.3 to smaller wholesale cooperatives, and the remaining 25.9 percent to other firms. Estimates indicate that about 85 percent of the total cooperative retail volume of oil and grease was obtained through wholesale cooperatives in 1957, compared with 80 percent in 1950.

In 1957, regional wholesale cooperatives sold 25.5 million pounds of grease. Of these sales, they distributed 71.2

percent to affiliated local cooperatives, 22.2 percent to smaller regionals, and 6.6 percent to other firms. These sales represented an increase of 32 percent over the 19.3 million pounds sold in 1950.

The volumes of lube oil and grease distributed at wholesale exceeded those distributed at retail by 74 and 27 percent, respectively. This situation occurred because of the lube oil refining and grease manufacturing operations of the regionals. A substantial amount of these products were supplied to other regional cooperatives and other oil firms.

Refining and Manufacturing

The first cooperative refinery was built in 1939. With the advent of World War II, the decline in the supply of petroleum fuels for farming use became critical. As a result, several regional cooperatives purchased refineries to assure a dependable source of supply at reasonable prices. Acquiring such plants represented a major development of cooperatives in integrating their petroleum operations. It marked their first real excursion into highly technical manufacturing operations.

Refineries Operated

In 1957, 13 regional cooperatives operated 11 refineries. Six of the 13 associations each owned one refinery; one operated three refineries; three of the preceding associations along with three other regionals jointly owned one plant; and three other regionals in the East jointly owned one large refinery. Thus, there has been more coordination among regionals in the ownership of refineries than in any other phase of their petroleum operations. Also, refined fuels were exchanged among these regionals whenever mutually advantageous.

In 1950, 14 regional cooperatives had ownership in 20 petroleum refineries. The number of refineries has declined since then as supplies of fuel became adequate, and as the high cost of modernizing refineries and keeping them up to date has increased. Also, some of the plants were not located for the most efficient transportation of fuels to the regionals' distribution areas.

Capacities of Refineries

The total crude oil distillation capacity of the 11 cooperative oil re-

fineries in 1957 was reported to be 155,700 barrels a calendar day. This compared with 144,500 barrels a day for the 20 cooperative oil refineries operated in 1950. Capacity of the cooperative plants was equivalent to approximately 1.6 percent of the capacity reported for all refineries in the United States in 1957 compared with 2.0 percent of the total in 1950.

The 11 cooperative refineries had the following capacities: 3 had 20,000 barrels or more a day; 5 had between 10,000 and 20,000 barrels a day; 2 had between 5,000 and 10,000 barrels a day; and 1 had less than 5,000 barrels a day.

The total thermal cracking capacity of these refineries was 25,925 barrels a day in 1957, representing 1.2 percent of the total thermal cracking capacity in the United States, based upon barrels per stream-day input or charge capacity. Two refineries did not have such units.

In 1950, thermal cracking capacity of the 17 refineries with such units was 47,800 barrels a day. This was 1.7 percent of the total thermal cracking input or charge capacity in the United States. Thermal processing by two refineries included delayed coking equipment with a capacity of 19,000 barrels a stream day.

The catalytic cracking capacity on an input or charge basis of eight cooperative refineries with such units in 1957 was 64,500 barrels a day. This represented 1.5 percent of the total catalytic cracking input a stream day or charge capacity in the United States. In 1950 only four cooperative refineries had catalytic cracking equipment. Their capacity totaled only 21,300 barrels a day, or 1.0 percent of total capacity in the United States.

Catalytic reforming capacity of eight cooperative refineries in 1957 was 29,530 barrels a day. This was equivalent

to 1.9 percent of the total catalytic reforming capacity in the United States based on barrels per stream-day input. Most of these facilities were platforming units. Such data were not obtained for the cooperatives in 1950.

Catalytic hydrogenation by three refineries included unifining units with a capacity of 8,500 barrels a day.

Polymerization capacity reported in 1957 by eight cooperative refineries was 6,845 barrels a day. This was equivalent to 4.6 percent of the total per stream day of production for the United States.

Other facilities included the following: coke production at 400 tons a stream day by two plants; asphalt production at 6,350 barrels a stream day by three plants; an alkylation unit with a capacity of 1,500 barrels a day; and a light petroleum gas unit for the manufacture of propane.

Cooperatives found it necessary to add these modernized facilities because of increases in octane requirements and relatively low prices available for residual fuel oil in some years. Such improvements enabled the plants to produce a larger percentage of higher octane gasoline and heating fuels, a smaller percentage of residual fuel oil, and additional products such as asphalt and coke where those units were added.

The potential production capacity of all cooperative refineries was about 2.4 billion gallons of refined liquid fuels in 1957. Such a volume would have been about 22 percent more than that distributed at wholesale by the cooperatives that owned refineries, and 8 percent more than the total wholesale volume of all cooperatives. In 1950, potential production capacity of refineries exceeded wholesale volume of all cooperatives by 36 percent.

Crude Oil Processed

Cooperative refineries processed 50.5 million barrels of crude oil during their 1957 fiscal year (figure 3). This amounted to 138,369 barrels a calendar day. They operated, therefore, at about 89 percent of capacity.

In 1950, cooperatives processed 106,900 barrels a day. The total quantity of crude oil processed by cooperatives in 1957 was equivalent to 1.74 percent of the total barrels processed by 289 refineries operated in the United States in 1957. Cooperatives refined 1.86 percent of the total barrels processed by 325 refineries operating in this country in 1950.

Cooperatives with refineries transported more than 28.3 million barrels of crude oil through 1,499 miles of crude oil gathering pipelines and 566 miles of trunk lines in 1957. Thus, with their own pipelines they moved into their refineries 53.5 percent of the crude oil they processed. They had seven barges that hauled 2.5 million barrels of crude oil, or 5 percent of that processed, to the refineries. Also, 25 highway transports hauled 1.9 million barrels, or 3.7 percent of the amount processed, to the plants.

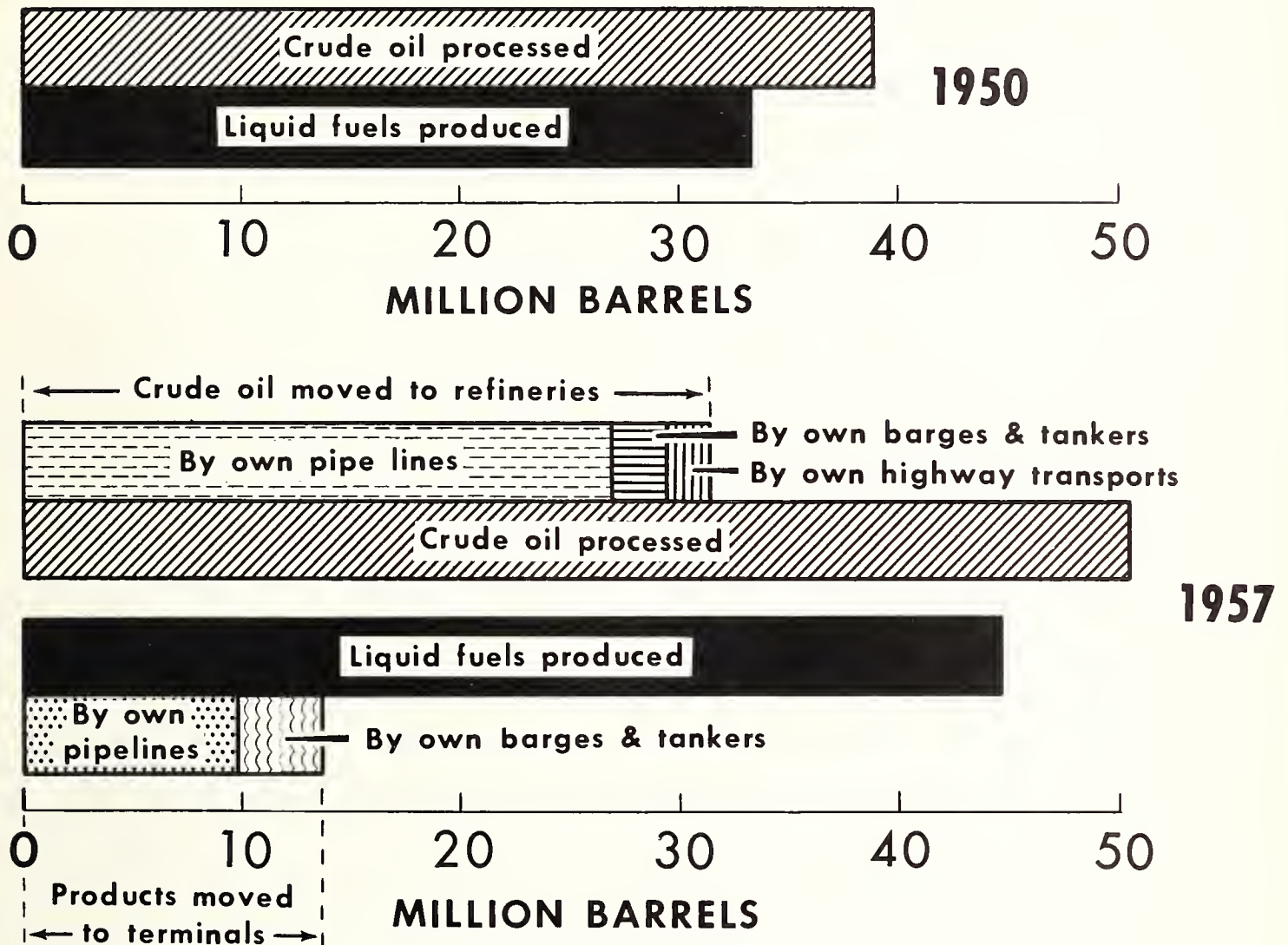
Production of Refined Fuels

The production of liquid fuels by cooperative refineries in 1957 totaled 44,603,300 barrels, or 122,200 barrels a calendar day (figure 3). This was almost 1.9 billion gallons, or about the same quantity that was distributed at retail by affiliated local cooperatives and retail bulk plants and stations owned by the regionals. This output was equal to almost 85 percent of the total wholesale volume distributed by all regional cooperatives.

Production of refined fuels in 1950 was 33.3 million barrels, or 91,300

FIGURE 3

Petroleum Refining Operations of Farmer Cooperatives, 1950 and 1957



barrels a day. This was 1.4 billion gallons, or a little less than the quantity distributed at retail by all cooperatives, and equivalent to 86 percent of the total wholesale volume of cooperatives that year.

Using the total barrels of crude oil processed as the base, product yields of 10 cooperative refineries in 1957 were as follows: 50.8 percent was gasoline; 31.3 percent was other light ends or intermediates (including jet fuel, kero-

sene, diesel fuel, other tractor fuel, and heating, burner, or furnace oils); 9.1 percent was residual fuel oil; and 7.1 percent was other products such as lubricating oil, asphalt, coke, and L. P. gas. The remaining 1.7 percent represented losses. (Data on one large refinery were excluded in these calculations because it processed a considerable amount of stocks other than crude oil.)

Gasoline yields from most plants in 1957 were 50 to 55 percent of the total

compared with 40 to 45 percent in 1950. Other light ends or intermediates were from 25 to 30 percent in both years. Residual fuel oils and other products accounted for 15 to 20 percent compared with 25 to 30 percent in 1950. This increase in gasoline and the reduction in yield of heavy ends reflected the operation of new cracking facilities added during the period. The residual fuel oil and other byproducts were sold to commercial outlets because farmers cannot use them.

Data were not obtained on storage facilities at cooperative refineries in 1957. In 1949, however, cooperative refineries had storage facilities for 2,585,000 barrels of crude oil and 5,260,000 barrels of refined products.

Cooperatives owned 694 miles of product pipelines in 1957, which transported almost 10 million barrels of liquid fuels from refineries to terminals. This represented about 22 percent of the total refined. Almost 95 percent of these liquid fuels were transported for distribution by the cooperatives, with only 5 percent transported for other companies. In 1950, cooperatives owned 258 miles of product pipelines, but data on quantity of liquid fuels transported in them are not available.

Cooperatives operated 11 barges and 2 tankers for hauling liquid fuels in 1957. These facilities transported for the cooperatives that owned them approximately 3.8 million barrels, or 8.5 percent of total quantities refined by all cooperatives. Seven of the barges also transported crude oil as well as liquid fuels.

Refining and Blending Lubricating Oil

Only one regional cooperative produced or refined lubricating oil. This association has refining equipment with a capacity of approximately 20 million gallons, or 476,190 barrels, of lubri-

cating oil annually. In 1957, its production was 18 million gallons compared with 8.5 million gallons in 1950. The output for 1957 was equivalent to about 85 percent of the total gallons distributed at retail and to 49 percent of the total sold at wholesale by all cooperatives.

An early step taken by regional cooperatives to integrate their petroleum operations was blending or compounding motor oils. These early efforts to integrate were prompted by difficulties in obtaining for members uniform lubricating oils which would withstand motor heat. Attempts by one regional cooperative to buy oils from manufacturers on guaranteed specifications resulted in its building a compounding plant. Later, other regionals joined with this cooperative to form a separate association which is now operating two oil-blending plants and providing wholesale services on a national basis for a large number of regionals.

In 1957, 6 regional cooperatives operated 10 blending, or compounding, plants with a rated capacity of 41.1 million gallons a year. The volume of lubricating oil compounded by these plants in 1957, however, was only 20.2 million gallons. This was slightly less than the 21.2 million gallons distributed by all local cooperatives in that year. A few of the smaller regional cooperatives bought bulk lubricating oil from other regional cooperatives and barreled or packaged it under their own trademarks in their own oil barreling plants.

In 1950, the total volume of lubricating oil compounded by 13 cooperative plants was 15.7 million gallons compared with about 18 million gallons distributed at retail that year.

Manufacturing Grease and Other Products

Only one regional cooperative operated a grease manufacturing plant. It

produced 6.8 million pounds in 1957 compared with 5.3 million pounds in 1950. Some of this was supplied to other wholesale cooperatives.

Other finished products produced by

cooperative refineries in 1957 were as follows: coke, 120,900 tons by two plants; asphalt, 1,504,511 barrels by two plants; and liquefied petroleum gas, 676,442 barrels by five plants.

Production of Crude Oil

Cooperatives began production of crude oil soon after acquiring refineries -- thus taking another major step in vertical integration. They did this primarily because they wished to provide themselves with a more dependable supply of crude oil for their refining operations. Also, they believed production would give them additional savings which would be especially helpful in years when savings from refining were abnormally small.

Producing Oil Wells

In 1957, 10 cooperatives representing 12 regional cooperatives were producing crude oil. They owned 3,318 producing oil wells on a gross basis and 1,691 producing wells on a net basis.⁵ In 1950, 10 cooperatives representing 12 regionals owned 1,945 gross producing oil wells and 1,562 net producing wells.

The gross producing oil wells owned by cooperatives increased substantially between 1950 and 1957, but they represented only 0.6 percent of the total producing oil wells in the United States in 1957 compared with 0.4 percent in 1950. Most cooperatives have purchased rather than drilled producing wells to secure an immediate supply of oil and to avoid the risks in drilling wildcat wells.

At the end of 1950, 12 cooperatives representing 14 regionals held under

lease 63,488 net acres of producing leaseholds, including acreage of royalties and mineral rights. They also had 310,032 acres of nonproducing or prospective leaseholds, royalties, and mineral rights. Estimated crude oil reserves of eight of these regionals with largest holdings totaled 32,250,000 net barrels in 1950. Comparable data on acreages and reserves were not obtained in 1957.

Production Operations

Crude oil production by cooperatives involved the operation and maintenance of equipment necessary to lift the crude oil and place it in storage tanks. It also included cleaning out and conditioning wells so that the highest possible recovery of crude oil from the oil sand is ultimately obtained.

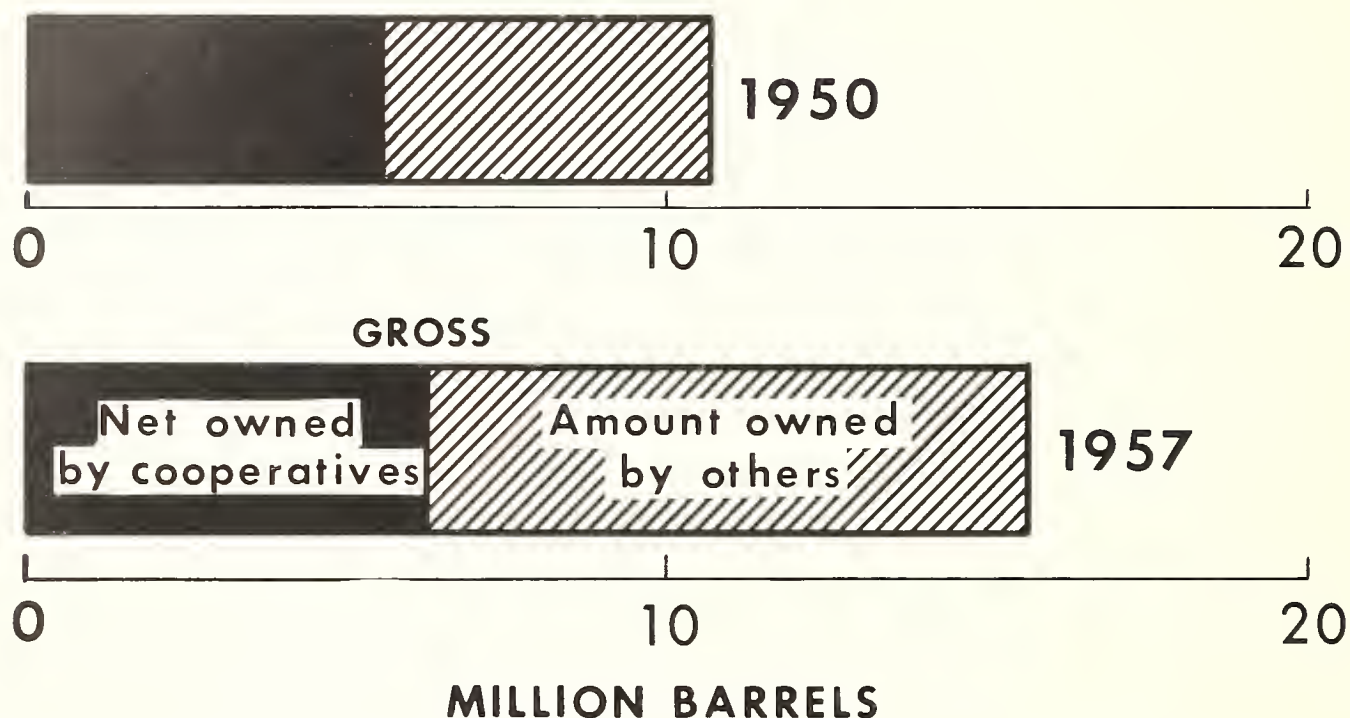
In 1957, 10 cooperatives produced 15,568,492 barrels of crude oil, an average of 42,653 barrels a calendar day on a gross basis; that is, before eliminating oil belonging to royalty owners and partners in jointly owned leases (figure 4). The net ownership of the cooperatives was equivalent to 6,328,612 barrels, or 17,339 barrels a calendar day, and represented 40.6 percent of the total.

In 1950, 10 cooperatives produced 10,731,000 barrels, an average of 29,400 barrels a calendar day on a gross basis, and produced 5,581,580 barrels, or an average of 15,292 barrels a day, on a net basis.

⁵Gross basis includes wells in which a cooperative shared ownership with other companies, and net basis represents the equivalent to wholly owned oil wells.

FIGURE 4

Production of Crude Oil by Farmer Cooperatives, 1950 and 1957



¹"Gross" includes total production from wholly owned and partially owned oil wells. "Net" represents cooperatives' portion of gross production after eliminating oil belonging to royalty owners and partners in jointly owned leases.

Two of the cooperatives with refineries had no crude oil production. Three cooperatives with crude oil production had no refineries of their own at the end of 1957, but one had started construction on the first phase of a petroleum refinery late in 1958.

The gross production of crude oil by the 10 cooperatives with oil wells in 1957 represented 30.8 percent of the crude oil processed by all cooperative refineries in that year. In 1950, 10 cooperatives produced crude oil on a gross basis equivalent to 27.5 percent of the crude oil processed by all cooperative refineries in that year.

In 1957, gross crude oil production of seven cooperatives that had both

crude oil production and refineries was equal to 36.7 percent of the crude oil they refined. In 1950, gross crude oil production of the 10 organizations with both crude oil production and refining operations was 31.4 percent of the total quantity they refined.

Two associations each had gross production of crude oil ranging from 55 to 60 percent of their crude oil runs to stills (barrels processed); one each of three associations had gross production equivalent to 43 percent, 21 percent, and 15 percent, respectively; and two each had gross production equal to less than 10 percent in 1957.

Gross production was equal to 27.4 percent of the crude oil distillation

capacity of all cooperatives in 1957 compared with 20.3 percent in 1950.

The net production of crude oil by the 10 cooperatives with oil wells represented 12.5 percent of the crude oil processed by all cooperative refineries in 1957. This compares with 14.3 percent in 1950. Seven cooperatives both produced and refined crude oil, and in 1957 their net production of crude oil was equal to 14.7 percent of the crude oil they processed. Net production in 1950 by those cooperatives that both produced and refined oil was equal to 14.5 percent of the crude oil they processed.

One cooperative had net production equivalent to 22 percent of runs to stills; four others had net production of 15 to 20 percent; and two each had less than 5 percent.

Net production of all cooperatives in the United States was equal to 11.1 percent of the crude oil distillation capacity of all cooperative refineries in 1957 compared with 10.7 percent in 1950.

The production of crude oil from all oil wells in the United States in 1957 was equal to 76.2 percent of the crude distillation refining capacity of the 289 refineries in operation. This was equal to 90.5 percent of the total crude oil run to stills. Both the gross and net production of cooperatives in relation to

their runs to stills was, therefore, much smaller than that of the petroleum industry as a whole.

Crude Oil Purchasing

Since cooperatives do not produce the necessary quantities of crude oil for their refinery use, they buy additional amounts from royalty interest holders, independent producers, and other refiners. They buy mostly from independent producers at posted prices on a contract basis, although some long-term contracts have been used.

Some cooperatives, in addition to having access to the total or gross crude oil produced jointly with other partners, control additional amounts through their own pipeline gathering operations and by having first call to purchase various amounts.

Cooperatives handle their crude oil purchasing activities along with their pipeline, barge, and other crude oil transportation operations. Most of the crude oil moves to refineries by pipelines. In addition to gathering oil produced by the cooperatives, these pipelines receive from other carriers crude oil which has been purchased by the cooperatives. Purchasing and exchanging of crude oil among regionals has occurred in small amounts.

Transportation Operations

Transportation is important in all phases of petroleum operations. To provide efficient, dependable transportation service, cooperatives now own tank trucks, highway motor transports, towboats, barges, tankers, and pipelines.

While the various transportation services of cooperatives have already been discussed under each major type of integrated operation, they are all

brought together and discussed in greater detail in this section of the report

Tank Trucks and Highway Motor Transports

Local cooperatives and branch stations of regional associations operated a total of 5,684 retail tank trucks in 1957, with 323 used for hauling liquefied

petroleum gas and the remainder used for liquid fuels. In 1950, cooperatives operated 5,440 retail tank trucks, including 70 for liquefied petroleum gas.

The cooperatives owned more than half of the truck chassis in 1957. The salesmen employed by the cooperatives on a commission basis owned the remainder. Many of the truck tanks for liquid fuels had increased in capacity from 800 to 1,000 gallons in 1950 to 1,200 to 1,500 gallons in 1957.

In 1950 and earlier, tank trucks were equipped with mechanical unloading pump and meter, and in 1957 a large number had dual sets of such equipment.

About 95 percent of all liquid fuels sold at retail by cooperatives in 1957 was hauled in their tank trucks. This included bulk deliveries to patrons and some gasoline hauled from bulk plants of local cooperatives to their own service stations. Many service stations, however, received fuel direct from highway transports that loaded from refinery or other storage terminals. The cooperatives delivered to patrons about 90 percent of their L. P. gas volume in association tank trucks, with the remaining amount handled in "bottles."

In 1957, 18 regional cooperatives operated 299 highway transports, including 11 for hauling liquefied petroleum gas and 25 for transporting crude oil. Local cooperatives operated 168 highway transports, thus making a total of 467 highway transports operated by cooperatives in 1957.

In 1950, cooperatives operated 375 highway transports -- 250 by regionals and 125 by locals. Most of these transports had a capacity of 5,000 gallons or more with several truck-trailers having a capacity of 7,500 gallons or more.

In 1957, cooperatives transported approximately 1.2 billion gallons of liquid fuels, or 56 percent of cooperative wholesale volume, from terminals and refineries in 431 highway transports.

They hauled over 13 million gallons, or 14 percent, of the wholesale volume of L. P. gas in 11 of their transports. Also, 25 highway transports hauled 1,864,155 barrels of crude oil, or 3.7 percent of that processed, to cooperative refineries. Such data were not available for 1950.

Barges and Tankers

Cooperatives operated 11 barges and 2 tankers for liquid fuels in 1957. The cooperatives owning these facilities used them to transport approximately 3.8 million barrels. This represented 8.4 percent of the liquid fuels refined by cooperative plants that year. None was hauled for other companies.

Cooperatives operated seven barges for transporting crude oil. It was assumed that these facilities also were included in those reported as hauling liquid fuels and, therefore, used for both purposes. The barges hauled 2,503,000 barrels of crude oil, or 5 percent of that processed, to the cooperative refineries.

In 1950, cooperatives operated 21 barges used primarily for transporting refined fuels, and 4 towboats and 3 ocean-going tankers used for crude oil and refined products. Data were not obtained on quantities hauled that year.

Pipelines

Seven of the 13 cooperatives operating refineries owned 1,499 miles of crude oil gathering pipelines and 566 miles of crude oil trunk lines in 1957. This mileage was equivalent to 2 percent of the total miles of crude oil gathering lines and to 0.7 percent of the crude trunk lines in the United States. Cooperatives thus owned less crude oil pipelines than in 1950 when they had 1,765 miles of gathering pipelines and 610 miles of trunk lines.

In addition to transporting crude oil produced and purchased for cooperative refineries, these pipelines gathered and made deliveries for other oil companies and also delivered crude oil to other carriers for accounts of the cooperatives. Some of the cooperative pipelines were classified as common carriers, subject to regulations of the Interstate Commerce Commission.

Cooperatives delivered more than 28.3 million barrels of crude oil by pipelines in 1957. Approximately 95 percent of this crude oil was for their own refineries. Cooperatives, therefore, transported with their own pipelines about 53.5 percent of the crude oil they processed in their own refineries. The pipelines of one cooperative delivered 11.6 million barrels of crude oil to its refineries of which 6.5 million barrels

were gathered directly from wells. Data were not obtained on crude oil storage at refineries, pipeline stations, and wells.

Cooperatives reported operating 694 miles of products pipelines in 1957, which represented 1.9 percent of the total products pipeline mileage in the United States. The cooperative lines transported almost 10 million barrels of liquid fuels from refineries to terminals in 1957 with almost 95 percent transported for distribution by the cooperatives. The quantity moved through these pipelines was 22.3 percent of the liquid fuels refined by cooperatives.

In 1950, cooperatives owned only 258 miles of product pipelines, but data were not obtained on the quantity they moved that year.

Appendix

Data on petroleum industry in United States, 1950 and 1957¹

	<u>1950</u>	<u>1957</u>
<u>Marketing</u>		
Domestic demand for:	<i>Barrels a calendar day²</i>	
Gasoline	2,724,000	3,817,000
Kerosene	323,000	295,000
Distillates	<u>1,082,000</u>	<u>1,691,000</u>
Total	4,129,000	5,803,000
<u>Refining</u>		
	<i>Number</i>	
Refineries operated	325	289
Refineries shut down	32	29
 Capacities (as of December 31) ³		
	<i>Barrels a calendar day</i>	
Crude distillation capacity	6,963,644	9,407,707
Thermal cracking capacity - input ⁴	2,812,000	2,202,355
Thermal cracking capacity - output	776,746	529,273
Catalytic cracking capacity - input ⁴	2,130,000	4,180,065
Catalytic cracking capacity - output	780,810	1,456,687
Reforming capacity - input ⁴	366,500	1,520,930
Reforming capacity - output	295,500	1,223,160
Crude oil run to stills (processed)	5,739,000	7,919,000
<u>Production</u>		
	<i>Number</i>	
Producing oil wells	465,870	569,273
 <i>Barrels a calendar day</i>		
Crude oil produced	5,407,000	7,169,000
<u>Transportation</u>		
	<i>Number of miles</i>	
Crude oil gathering pipelines	47,593	⁵ 73,526
Crude oil trunk pipelines	64,622	⁵ 78,594
Product pipelines	16,374	⁵ 36,420
 <i>Barrels a calendar day</i>		
Crude oil transported in pipelines ⁶	4,223,000	5,850,000
Products transported in pipelines	1,094,000	2,471,000

¹Source: Oil and Gas Division, U. S. Department of Interior, except as otherwise indicated.

²All data are on basis of a calendar day except those for input or charge capacity indicated by footnote 4.

³Includes operating and shutdown plants.

⁴Barrels a stream day calculated at 0.95 of a calendar day basis, or 347 days per year, as reported in Oil and Gas Journal, March 4, 1958.

⁵As of January 1, 1956 - the last survey made.

⁶Quantities received at refineries via pipelines. Additional quantities moved by pipelines from producing fields to gulf coast ports.

